Characterization and source apportionment of carbonaceous aerosols in China

Ni, Haiyan

DOI:
10.33612/diss.79450942

Propositions belonging to the PhD thesis

Characterization and Source Apportionment of Carbonaceous Aerosols in China

Haiyan Ni

1. Chinese air pollution is a global problem.

2. China's commitment to improve air quality should be based on the knowledge and understanding the sources and nature of carbonaceous aerosols (organic and elemental carbon), a major contributor to air pollution.
(This thesis)

3. Radiocarbon (^{14}C) analysis shows that a sizeable fraction of carbonaceous aerosols is from non-fossil origins (e.g., biomass burning, biogenic emissions), even for aerosols collected in urban areas.
(Chapter 2 &3 of this thesis)

4. In addition to primary carbonaceous aerosols that are directly emitted from a large variety of anthropogenic and biogenic sources, there is a considerable amount of secondary organic carbon (OC) formed in the atmosphere from gaseous precursors.
(Chapter 2 & 3 of this thesis)

5. The relative contribution of fossil sources to the more volatile fraction of OC is significantly larger than to total OC and secondary OC. This is mainly related to the influence of fossil primary emissions.
(Chapter 3 of this thesis)

6. Coal combustion is an important contributor to carbonaceous aerosols. However, as the most abundant and relatively cheap fossil fuel, coal will inevitably remain an important indigenous energy resource for the foreseeable future.

7. Coal combustion is an important source of brown carbon, and should be considered in further modelling of OC radiative forcing.
(Chapter 4 of this thesis)

8. Studies like the one conducted in this thesis fulfil the desire as formulated by James H. Vincent in 2007: "Aerosol sampling is a central aspect of the study, characterization and surveillance of atmospheric environments and it needed to be addressed scientifically in an integrated way in order that the results of aerosol sampling in the real world would have any meaning".